

JOHNSON'S SEAGRASS TRANSPLANTING STUDIES

PROBLEM STATEMENT

Johnson's seagrass, *Halophila johnsonii*, was placed on the State of Florida endangered species list as a result of its rarity in coastal waters and following the research of Eiseman (1980), Eiseman and McMillan (1980), and Dawes et al. (1989). The localized species was separated from *H. decipiens*, which was found in more offshore and deeper waters. Culture work and field observations indicated that *H. johnsonii* is a single sex species—no male flowers have been found. Its transient nature may result in it being absent during the colder months of the year.

Because of its endangered status, its localization in heavily developed areas, and its absence in certain areas during the winter, more information is needed about the ecology and life history of the species. Threats from development also point to the need for understanding its culture so that it may be restored or have its loss mitigated by creation or restoration of beds.

OBJECTIVES

The goal of this project is to determine the feasibility of and best methods for cultivation and transplantation of this species in order to protect and restore it. During this research, an opportunity arose to study the cultivation of the closely related paddle grass, *Halophila decipiens*. Like *H. johnsonii*, *H. decipiens* is rare and under even greater threat from coastal development, because it grows in channels and deeper waters, which subject it to damage from dredging and marina construction.

FINDINGS AND CONCLUSIONS

H. johnsonii was cultivated in sixty aquaria from Spring 2001 to Fall 2002 and was first planted in the field in Fall 2001. Growth in the field continues to the present, with successes at two sites, but with several failures due to unstable (erosional) substrates and siltation (field tests objectively compared all substrates and methods). In a recent field inspection of the most successful planting sites, Johnson's seagrass was still growing, and it had reached high densities at the Hillsboro Inlet site.

H. decipiens was collected from a local marina dredging project in October 2002 and cultured in 60 aquaria, in addition to tanks for reproduction and later replanting. Aquarium culture in the Winter 2002-03 months resulted in reductions in plant numbers, but this event was anticipated based on previous winter field and aquarium studies; by summer, plant numbers increased in excess of initial stocking densities. Paddle grass was planted in the Fall 2002 at Bahia Mar Marina but did not survive due to siltation from dredging activities and the onset of winter

temperatures. It was again planted at this marina in Spring 2003, and a recent field inspection showed that plants were growing and had apparently spread into adjacent areas from seeds, in one of three sites.

A comprehensive, overwintering field study was also performed on both species in 2001-02, and it showed that both species had reduced numbers in the winter months (centered around January and February). Braun-Blanquet ratings fell by ~50% and occurrence in quadrats fell by ~40%. These numbers returned to normal by Spring 2002.

Overall, holding and cultivation in aquaria was successful, and transplantation looks promising, with good results obtained for both species. These studies positively demonstrated the concept of holding pre-dredge halophiline seagrasses in aquaria or tanks for transplantation later. However, besides further testing, a number of modifications and guidelines for aquarium culture should be implemented, as follows:

1. Avoid collection and planting during the colder months (December - February).
2. Use shade cloth to simulate underwater light levels.
3. Use filtered seawater water and constant flow-through systems .
4. Use heat-sterilized sand as a substrate.
5. Use a heated head tank to flush to warm aquaria during the coldest months.
6. Aquaria require constant maintenance as described herein.



Above: The 60 main aquaria used for the cultivation of Johnson's seagrass and paddle grass, shown without heavy shade-cloth cover, inset shows cover (Baca 2003)

BENEFITS

Transplantation looks promising, and positive results are obtainable for *H. johnsonii* and *H. decipiens*, when proper substrates are used and under the right conditions. A few lessons learned about transplanting include the following:

1. Use of large clips, and sometimes multiple clips, to hold seagrasses in the substrate
2. Use of multiple plants (at least five) in each planting unit
3. Avoidance of areas with high siltation levels

Although these studies were not long term, a number of accomplishments were made which add to the potential for cultivating these plants. Further planting, testing, and long-term monitoring should help to increase success and should advance the feasibility of using these small and rare seagrasses in restoration and mitigation efforts.

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